

## PRESENTATIONS BY OWEN R. COOPER

- 2016 **Cooper, O. R.**, The Tropospheric Ozone Assessment Report: A community-wide effort to quantify tropospheric ozone in a rapidly changing world, *Keynote Talk*, 2016 Quadrennial Ozone Symposium, Edinburgh, Scotland, September 5, 2016.
- Cooper, O. R.**, The Tropospheric Ozone Assessment Report: A community-wide effort to quantify tropospheric ozone in a rapidly changing world, *Invited seminar*, University of Cambridge Centre for Climate Science, U. K., September 2, 2016.
- Cooper, O. R.**, The Tropospheric Ozone Assessment Report: A community-wide effort to quantify tropospheric ozone in a rapidly changing world, *Invited seminar*, Department of Chemistry, University of York, U. K., September 7, 2016.
- Cooper, O. R.**, The Tropospheric Ozone Assessment Report: A community-wide effort to quantify tropospheric ozone in a rapidly changing world, Department Seminar, Gillings School of Global Public Health, The University of North Carolina at Chapel Hill, October 13, 2016.
- Cooper, O. R.**, The Tropospheric Ozone Assessment Report: A community-wide effort to quantify tropospheric ozone in a rapidly changing world, *Invited seminar*, Nicholas School of the Environment, Duke University, October 14, 2016.
- Cooper, O. R.**, IGAC's Tropospheric Ozone Assessment Report (TOAR): Facilitating international research on ozone's impact on public health, vegetation and climate change, *Invited seminar*, Innovation Center of the Catholic University, Santiago, Chile, March 17.
- Cooper, O. R.**, Ozone pollution in the United States: The success of emissions controls and new challenges from international and stratospheric ozone sources, *Invited seminar*, Center for Climate and Resilience Research, Santiago, Chile, March 18.
- Cooper, O. R.**, The Tropospheric Ozone Assessment Report: A community-wide effort to quantify tropospheric ozone in a rapidly changing world, *Invited seminar*, Nanjing University, Nanjing, China, November 21.
- Cooper, O. R.**, The Tropospheric Ozone Assessment Report: A community-wide effort to quantify tropospheric ozone in a rapidly changing world, *Invited seminar*, Shandong University, Jinan, China, November 22.
- Cooper, O. R.**, The Tropospheric Ozone Assessment Report: A community-wide effort to quantify tropospheric ozone in a rapidly changing world, *Invited seminar*, Hong Kong Polytechnic University, Hong Kong, China, November 24.
- 2015 **Cooper, O. R.**, *Invited* Participant in the Transboundary Ozone Pollution Conference, Tenaya Lodge, Yosemite National Park, March 31 – April 2, 2015. Sponsored by the San Joaquin Valley Air Pollution Control District with participation from the NASA Air Quality Applied Sciences Team
- Cooper, O. R.**, Global distribution and trends of tropospheric ozone: An observation-based review, *Invited seminar*, University of Virginia, Department of Environmental Sciences, October 29, 2015.
- Cooper, O. R.**, Intercontinental pollution transport and its impact on the western United States, *Invited talk*, Air Quality Research Subcommittee, Department of Commerce, Washington DC, February 19, 2015.
- Cooper, O. R.**, Update on trends in background ozone concentrations, *Invited*, Modeling Air Quality from the Global to Local Scale, NCAR Center Green, Boulder, May 11-15, 2015.
- Cooper, O. R.**, TOAR: an overview of the Tropospheric Ozone Assessment Report, *Invited*, Modeling Air Quality from the Global to Local Scale, NCAR Center Green, Boulder, May 11-15, 2015.
- Cooper, O. R.**, TOAR: an overview of the Tropospheric Ozone Assessment Report, *Invited*, Chemistry Climate Model Initiative (CCMI) workshop, Rome, Italy, October 7-9, 2015.
- Cooper, O. R.**, TOAR: an overview of the Tropospheric Ozone Assessment Report, and the role of TOLNet, *Invited*, Second Annual Tropospheric Ozone Lidar Network (TOLNet) Working Group Meeting, NOAA ESRL, Boulder, June 16-18, 2015.
- Cooper, O. R.**, An Overview of IGAC's Tropospheric Ozone Assessment Report (TOAR) and an update on North American ozone trends, *Poster*, SPARC Regional Workshop: Chemical and Physical Processes in the Climate System, 9-10 November 2015, NCAR Foothills Laboratory, Boulder.

- 2014 **Cooper, O. R.**, Global distribution and trends of tropospheric ozone: An observation-based review, *Invited* oral presentation, Global Change Seminar Series, School of GeoSciences, University of Edinburgh, Scotland, April 4, 2014.
- Cooper, O. R.**, Global distribution and trends of tropospheric ozone: An observation-based review, *Invited* oral presentation, MOZAIC-IAGOS Scientific Symposium on Atmospheric Composition Observation by Commercial Aircraft, Toulouse, France, 12-16 May, 2014.
- Cooper, O. R.**, Global distribution and trends of tropospheric ozone: An observation-based review, *Invited* oral presentation, NCAR Advanced Study Program Seminar Series, Boulder, March 19, 2014.
- Cooper, O. R.**, “IPCC AR5 Chapter 2. Observations: Atmosphere & Surface”, *Invited* oral lecture in the CIRES/ATOC Seminar Series: Reading the IPCC Report, CIRES, University of Colorado, Boulder, September 9, 2014.
- Cooper, O. R.**, Inflow processes over Western North America, *Invited* oral presentation, Joint Workshop of AQMEII3 and TF HTAP, U.S. EPA, Research Triangle Park, NC, October 30, 2014.
- Cooper, O. R.**, Global distribution and trends of tropospheric ozone: An observation-based review, Poster, CCMI (Chemistry-Climate Model Initiative) Workshop, Lancaster, UK, 20-22 May, 2014.
- Cooper, O. R.**, An overview of the new Tropospheric Ozone Assessment Report (TOAR), Poster, 13<sup>th</sup> IGAC Science Conference on Atmospheric Chemistry, Natal, Brazil, 22-26 September, 2014.
- Cooper, O. R.**, Global distribution and trends of tropospheric ozone: An observation-based review, Poster, CIRES Science Rendezvous, University of Colorado, Boulder, May 2, 2014.
- 2013 **Cooper, O. R.**, Long-term ozone trends at rural ozone monitoring sites across the United States, 1990-2010, Chemical Sciences Division Seminar, NOAA ESRL, Boulder, January 16, 2013.
- Cooper, O. R.**, Long-term ozone trends at rural ozone monitoring sites across the United States, 1990-2010, *Invited* Oral Presentation, Harvard School of Engineering and Applied Sciences Environmental Science and Engineering Seminar, Harvard University, Cambridge, March 8, 2013.
- Cooper, O. R.**, Inflow processes influencing air quality over Western North America, *Invited* oral presentation, Meeting of the Task Force on Hemispheric Transport of Air Pollution, March 20-22, 2013, Geneva, Switzerland.
- Cooper, O. R.**, Global surface ozone trends, a synthesis of recently published findings, oral presentation, IGAC/SPARC Chemistry-Climate Model Initiative (CCMI) 2013 Science Workshop, May 14-16, 2013, NCAR, Boulder.
- Cooper, O. R.**, Global surface ozone trends, a synthesis of recently published findings, oral presentation, NOAA GMD Global Monitoring Annual Conference, May 21-22, 2013, Boulder.
- Cooper, O. R.**, Status of IAGOS in the USA Working Group, *Invited* Oral Presentation at the IAGOS Annual Meeting, San Lorenzo del Escorial, Spain, June 12-14, 2013.
- 2012 **Cooper, O. R.**, Western US ozone trends, 1990-2010, *Invited* Oral Presentation, WESTAR Council & the University of Nevada Conference on Western Ozone Transport, October 10-12, 2012, Reno.
- Cooper, O. R.**, Ozonesonde and aircraft measurements during CalNex, *Invited* Oral Presentation, WESTAR Council & the University of Nevada Conference on Western Ozone Transport, October 10-12, 2012, Reno.
- Cooper, O. R.**, R. Gao, D. Tarasick, T. Leblanc and C. Sweeney, Long-term ozone trends at rural ozone monitoring sites across the United States, 1990-2010, Poster Presentation, American Geophysical Union Fall Meeting, San Francisco, December 3-7, 2012.
- 2011 **Cooper, O. R.**, et al., Measurement of Western U.S. Baseline Ozone from the Surface to the Tropopause and Assessment of Downwind Impact Regions, oral presentation, 39<sup>th</sup> NOAA ESRL Global Monitoring Annual Conference, May 17-18, 2011, Boulder.
- Cooper, O. R.**, A. Volz-Thomas, and J.-P. Cammas, IAGOS in the USA: An opportunity for commercial airlines to monitor air quality and greenhouse gases above the United States, *Invited* Oral Presentation, AIAA Hawaii Conferences, The Science Underpinning Aviation Impacts on the Environment, Honolulu, June 28, 2011.
- Cooper, O. R.**, IAGOS in the USA: progress report, *Invited Speaker*, IAGOS-ERI Annual Meeting, Manchester, U.K., September 12 – 14, 2011.

- Cooper, O. R.**, Long range transport impacts on ozone air quality in the western United States, *Invited Seminar Speaker*, Department of Atmospheric and Oceanic Sciences, University of Colorado at Boulder, October 28, 2011.
- Cooper, O. R.**, Long range transport impacts on California's ozone air quality, *Invited* Oral Presentation, American Geophysical Union Fall Meeting, San Francisco, 2011.
- 2010 **Cooper, O. R.**, Increasing springtime ozone mixing ratios in the free troposphere over western North America, Chemical Sciences Division Seminar, NOAA ESRL, Boulder, *invited*, Feb 3, 2010.
- Cooper, O. R.**, S. J. Oltmans, B. J. Johnson, M. Trainer, D. D. Parrish, T. R. Ryerson, I. Pollack, Patrick Cullis, M. A. Ives, D. W. Tarasick, J. Al-Saadi, I. Stajner, First multi-site assessment of tropospheric baseline ozone along the U.S. west coast, oral presentation, American Geophysical Union Fall Meeting, San Francisco, 2010.
- 2009 **Cooper, O. R.**, The influence of lightning NO<sub>x</sub> emissions on the summertime North American upper tropospheric ozone maximum, *Invited talk* at the Fourth Conference on the Meteorological Applications of Lightning Data, 89<sup>th</sup> American Meteorological Society, Annual Meeting, 11–15 January, 2009, Phoenix.
- Cooper, O. R.**, et al., Increasing mid-tropospheric ozone above western North America during springtime, oral presentation, NOAA/ESRL Global Monitoring Annual Conference, May 13-14, 2009, Boulder.
- Cooper, O. R.**, et al., Increasing mid-tropospheric ozone above western North America during springtime, oral presentation, Tropospheric Ozone Changes: Observations, state of understanding, and modeling requirements Workshop at NOAA/ESRL, Boulder, October 14-16, 2009.
- 2008 **Cooper, O. R.**, S. Eckhardt, J. H. Crawford, C. C. Brown, R. C. Cohen, T. H. Bertram, P. Wooldridge, A. Perring, W. H. Brune, X. Ren, D. Brunner, and S. L. Baughcum, The summertime buildup and decay of lightning NO<sub>x</sub> and aged thunderstorm outflow above North America, oral presentation, American Geophysical Union Fall Meeting, San Francisco, 2008.
- 2007 **Cooper, O. R.**, Evidence for a recurring eastern North America upper tropospheric ozone maximum during summer, *Invited Seminar Speaker*, Atmospheric Science Department, The University of Alabama in Huntsville.
- Cooper, O. R.**, Tropospheric Ozone: Global distribution and radiative forcing, speaker at the NOAA ESRL Theme Presentation: Radiative Forcing of Climate by non-CO<sub>2</sub> Atmospheric Gases, NOAA Earth System Research Laboratory, Boulder.
- Cooper, O. R.**, et al., Evidence for a recurring eastern North America upper tropospheric ozone maximum during summer, oral presentation, American Geophysical Union Fall Meeting, San Francisco, 2007.
- Cooper, O. R.**, et al., Large upper tropospheric ozone enhancements above mid-latitude North America during summer: In situ evidence from the IONS and MOZAIC ozone monitoring network, *invited talk* at the NOAA Office of Oceanic and Atmospheric Research's Senior Research Council, Chantilly, Virginia, December 4, 2007.
- Cooper, O. R.**, Observational evidence of tropospheric ozone trends in North America: Three contributions from NOAA/ESRL, Joint TFHTAP (Task Force on Hemispheric Transport of Air Pollutants) and WMO Workshop on Integrated Observations for Assessing Hemispheric Air Pollution, 24-26 January 2007, World Meteorological Organization Headquarters, Geneva
- 2006 **Cooper, O. R.**, et al., Influence of lightning NO<sub>x</sub> on the summertime upper tropospheric ozone enhancement above eastern North America, *Invited talk*, American Geophysical Union Fall Meeting, San Francisco, 2006.
- 2005 **Cooper, O. R.**, A. Stohl, G. Hübler, E. Y. Hsie, D. D. Parrish, A. F. Tuck, G. N. Kiladis, S. J. Oltmans, B. J. Johnson, M. Shapiro, J. L. Moody and A. S. Lefohn, Direct transport of mid-latitude stratospheric ozone into the lower troposphere and marine boundary layer of the tropical Pacific Ocean, *Invited talk*, NOAA Aeronomy Lab Seminar Speaker, Feb. 9, 2005.
- Cooper, O. R.**, A. Stohl, G. Hübler, E. Y. Hsie, D. D. Parrish, A. F. Tuck, G. N. Kiladis, S. J. Oltmans, B. J. Johnson, M. Shapiro, J. L. Moody and A. S. Lefohn, oral presentation, Direct transport of mid-latitude stratospheric ozone into the lower troposphere and marine boundary layer of the tropical Pacific Ocean, European Geosciences Union, General Assembly 2005, Vienna.

- Cooper, O. R.**, et al., Large upper tropospheric ozone enhancements above mid-latitude North America during summer: In situ evidence from the IONS and MOZAIC ozone monitoring network, American Geophysical Union Fall Meeting, San Francisco, 2005.
- Cooper, O. R.**, Anomalous tropospheric ozone events influenced by natural processes: The North American upper tropospheric ozone maximum and stratospheric intrusions above Hawaii, *invited talk* to the Oslo Climate Group Distinguished Lecture Series, Oslo, Nov., 15, 2005.
- Cooper, O. R.**, Anomalous tropospheric ozone events influenced by natural processes: The North American upper tropospheric ozone maximum and stratospheric intrusions above Hawaii, *Invited talk*, Norwegian Institute for Air Research, Kjeller, Nov. 24, 2005.
- 2004 **Cooper, O. R.**, A. Stohl, S. Eckhardt, S. Oltmans, and B. Johnson, Anthropogenic NO<sub>x</sub> emissions, transport pathways, and their relationship to ozone profiles on the west and east coasts of the United States, *invited talk*, MOZAIC-III Final Meeting, January 14-16, 2004, Carcassonne, France.
- Cooper, O. R.**, A. Stohl, S. Eckhardt, D. D. Parrish, S. Oltmans, B. Johnson, P. Nédélec, F. J. Schmidlin, M. J. Newchurch, Y. Kondo and K. Kita, poster presentation, A springtime comparison of tropospheric ozone and transport pathways on the east and west coasts of the United States, 2004 IGAC Meeting, Christchurch, New Zealand.
- 2003 **Cooper, O. R.**, Current understanding of vertical and long-range transport through extratropical cyclones, *invited seminar* at the EGS-AGU-EUG Joint Assembly, Nice, France.
- Cooper, O. R.**, North American trace gas import and export: The role of mid-latitude cyclones, *invited seminar*, Harvard University, Cambridge, Massachusetts.
- Cooper, O. R.**, North American trace gas import and export: The role of mid-latitude cyclones, *invited seminar*, NOAA Climate Monitoring and Diagnostics Laboratory, Boulder, Colorado.
- Cooper, O. R.**, Transport mechanisms controlling North American trace gas import and export, *invited seminar*, Michigan Technical University, Houghton.
- Cooper, O. R.**, C. Forster, D. Parrish, E. Dunlea, G. Hübler, F. Fehsenfeld, J. Holloway, S. Oltmans, B. Johnson, A. Wimmers, and L. Horowitz, On the life-cycle of a stratospheric intrusion and its dispersion into polluted warm conveyor belts, oral presentation at the Fall meeting of the American Geophysical Union, San Francisco.
- 2002 **Cooper, O. R.**, C. Forster, D. Parrish, M. Trainer, E. Dunlea, T. Ryerson, G. Huebler, F. Fehsenfeld, D. Nicks, J. Holloway, J. Moody, A comparison of airstream trace gas signatures upwind and downwind of North America, oral presentation at AGU Fall Meeting, San Francisco.
- Cooper, O. R.**, A. Stohl, D. Parrish, M. Trainer, S. Oltmans, and B. Johnson, Stratospheric and tropospheric source regions of ozone entering the western United States troposphere, oral presentation at the BMU/UBA – USEPA-EMEP Workshop, Bad Breisig, Germany.
- Cooper, O. R.**, A. Stohl, D. Parrish, M. Trainer, S. Oltmans, and B. Johnson, Stratospheric and tropospheric source regions of ozone entering the western United States troposphere, poster presentation at the Joint CACGP/IGAC International Symposium, Heraklion, Crete.
- 2001 **Cooper, O. R.**, J. L. Moody, D. Parrish, M. Trainer, T. B. Ryerson, J. S. Holloway, G. Hübler, F. C. Fehsenfeld, M. J. Evans, A. Stohl, poster presentation, Trace Gas Composition of Mid-Latitude Cyclones over the Western North Atlantic Ocean: A Conceptual Model, AGU Spring Meeting, Boston.
- Cooper, O. R.**, *invited seminar*, Trace Gas Composition of Mid-Latitude Cyclones over the Western North Atlantic Ocean: A Conceptual Model, invited seminar at Deutsches Zentrum für Luft- und Raumfahrt, Institut für Physik der Atmosphäre, Oberpfaffenhofen, Germany.
- Cooper, O. R.**, *invited seminar*, Trace Gas Composition of Mid-Latitude Cyclones over the Western North Atlantic Ocean: A Conceptual Model, invited seminar at Rudjer Boskovic Institute, University of Zagreb, Croatia.
- 2000 **Cooper, O. R.**, Trace gas signatures of the airstreams within North Atlantic cyclones - Case studies from the NARE'97 aircraft intensive, seminar presented at the NOAA Aeronomy Laboratory, Boulder, March.
- Cooper, O. R.**, J. L. Moody, D. D. Parrish, M. Trainer, and S. J. Oltmans, Trace gas

- signatures of the transport sectors within a typical North Atlantic cyclone, 80th AMS Annual Meeting, Long Beach, January.
- 1999 **Cooper, O. R.**, J. L. Moody, A. J. Wimmers, K. P. Higgins, J. T. Merrill, A. I. Prados, R. R. Dickerson, and S. J. Oltmans, Temporal and spatial evolution of a tropopause fold and associated trace gas signatures over the eastern United States and Western North Atlantic Ocean, oral presentation at the 79th AMS Annual Meeting, Dallas, January.
- Cooper, O. R.**, J. L. Moody, D. D. Parrish, M. Trainer, and S. J. Oltmans, Frequency, origin, and chemical composition of stratospheric intrusions over the western North Atlantic Ocean, autumn 1997, (poster) AGU Fall Meeting, San Francisco, December.
- 1997 **Cooper, O. R.**, J. L. Moody, J. C. Davenport, S. J. Oltmans, B. J. Johnson, P. Shepson, and X. Chen, Atmospheric dynamic influence on vertical ozone distributions ahead of and behind cold fronts at three North American sites, *Eos Trans. AGU*, 78(46), F123.
- Cooper, O. R.**, J. L. Moody, J. C. Davenport, S. J. Oltmans, and B. J. Johnson, The influence of springtime weather systems on vertical ozone distributions over Charlottesville, VA (poster), *Eos Trans. AGU*, 78(17), S91.
- 1996 **Cooper, O. R.**, and J. L. Moody, The effects of atmospheric dynamics on ozone mixing ratio at an eastern U.S. mountain site, (poster) XVIII Quadrennial Ozone Symposium, L'Aquila, Italy, September.